MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2017/2018

DCS5078 – DATABASE SYSTEMS

(All IT Groups)

11 OCTOBER 2017
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENT:

1. This question paper consists of 11 pages with 2 sections.
2. **SECTION A**: Answer **ALL** Multiple Choice Questions on the OMR sheet given.
3. **SECTION B**: Answer **ALL** Structured Questions in the Answer Booklet provided.

SECTION A (40 Marks)

Instruction: *Answer **ALL** questions from this section and shade your answers on the OMR sheet provided.*

1. Which of the following statements is FALSE?

   A. Data constitutes the building blocks of information.
   B. Data is produced by processing information.
   C. Accurate, relevant, and timely information is the key to good decision making.
   D. Good decision making is the key to organizational survival in a global environment.

2. Which of the following can be classified as metadata?

   i. Date a picture is taken.
   ii. Resolution of an image.
   iii. Image file size.
   iv. Image format.

   A. i, ii and iii
   B. ii, iii and iv
   C. i, iii and iv
   D. i, ii, iii and iv

3. Data redundancy exists when the same data is stored unnecessarily at different places. Which of the following is NOT the effect of uncontrolled data redundancy?

   A. Data consistencies.
   B. Poor data security.
   C. Data entry errors.
   D. Data integrity problems.

4. A _____ is a database that is created and maintained using cloud data services, such as Microsoft Azure or Amazon AWS.

   A. Desktop database
   B. Cloud database
   C. Workgroup database
   D. Single-user database

5. Which of the following is a disadvantage of using a database system?

   A. Dependence on the vendor who are providing the service.
   B. Needs frequent updates and maintenance.
   C. Increased costs due to sophisticated hardware, software and skilled staff.
   D. All of the above.

Continued...

6. A _____ is a restriction placed on the data. It is expressed in the form of rules and is important because it helps to ensure data integrity.

   A. relationship
   B. schema
   C. constraint
   D. process

7. In an Object Oriented Data Model, the collection of similar objects with shared structure and behavior is called as:

   A. Class
   B. Group
   C. Entity
   D. Table

8. _____ are bidirectional.

   A. Entities
   B. Attributes
   C. Classes
   D. Relationships

9. Which of the following are sources of Business Rules?

   i. Top management.
   ii. End users.
   iii. Policy makers.
   iv. Written documents.

   A. i, ii and iii
   B. ii, iii and iv
   C. i, iii and iv
   D. i, ii, iii and iv

10. All of the following describes a Physical Model EXCEPT:

    A. Requires the definition of physical storage and data access methods.
    B. Operates at lowest level of abstraction.
    C. Represents a global view of the entire database by the entire organization.
    D. Describes the way data are saved on storage media such as disks or tapes.

11. When a key is Null, it could represent:

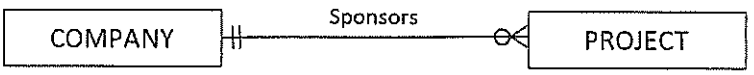
    A. Zero.
    B. Blank.
    C. A standard value set by the developer.
    D. An unknown attribute value.

Continued...

12. An attribute or combination of attributes strictly used for data retrieval and searching purpose is called as:

A. Primary key
B. Secondary key
C. Foreign key
D. Candidate key

13. What does the following Crow's Foot diagram state?

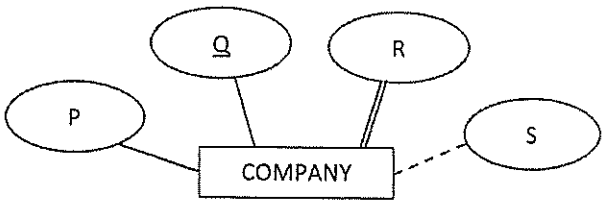


A. Company and Project have a recursive relationship.
B. Company and Project have a mandatory relationship.
C. Project is optional to Company.
D. Company is optional to project.

14. If an entity is used to represent an M:N relationship between two or more entities, it is called as a(n) _____.

A. strong entity
B. associative entity
C. derived entity
D. simple entity

15. Which of the following represents a derived attribute in a Chen Model ERD?



A. S
B. R
C. Q
D. P

16. The special operator that checks whether an attribute value matches any value within a given value list is:

A. IN
B. BETWEEN
C. EXISTS
D. LIKE

Continued...

17. When all the columns in a table needs to be displayed, the ____ symbol can be used in a SQL select command.

A. #
B. %
C. *
D. &

18. To view all the tables in a database, which of the following is used?

A. print tables;
B. display tables;
C. view tables;
D. show tables;

19. Which of the following will happen when the statement `truncate tablename` is executed?

A. The table will be emptied and new records entered will continue the primary key numbering.
B. The table will be emptied and the primary key value will restart with 1.
C. The whole table will be deleted.
D. The table will be duplicated.

20. SQL requires the use of the _____ command to enter data into a table.

A. ENTER
B. INPUT
C. INSERT
D. ADD

21. When a table has no partial and transitive dependencies, the tables is said to be in:

A. 4NF
B. 3NF
C. 2NF
D. 1NF

22. All of the following is FALSE about denormalisation EXCEPT:

A. It improves redundancy.
B. It increases the amount of tables in a database.
C. Queries can be quite complex as many tables are involved.
D. It improves disk space.

23. If a table has repeating groups, that means that the relation is in ____.

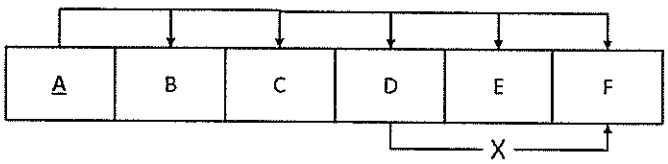
A. 1 NF
B. 2 NF
C. 3 NF
D. None of the above.

Continued...

24. When a relation is normalized by breaking it into smaller relations, how is the data integrity maintained?

A. Assign all the relations with the same primary key.
B. Link the relation using a foreign key or a common key.
C. Remove all foreign keys.
D. Assign all relations with the same foreign keys.

25. The diagram below is a part of a dependency diagram from 2NF. What does *X* represent?



A. Partial Dependency
B. Active Dependency
C. Passive Dependency
D. Transitive Dependency

26. Which of the following is NOT part of the physical design process of a database?

A. Define data storage organization.
B. Define integrity and security measures.
C. Distributed database design.
D. Determine performance measures.

27. _____ describes the extent to which modules are independent of one another.

A. Module coupling
B. Cohesivity
C. Multiplicities
D. Associativeness

28. Database initial study is the first phase in the Database Life Cycle (DBLC). Which of the following activities is NOT included in this phase?

A. Define problems and constraint.
B. Analyze the company situation.
C. Define scope and boundaries.
D. DBMS software selection.

29. Data stored in the company database must be protected from access by unauthorized users. _____ are usually provided by the DBMS to check for access violations.

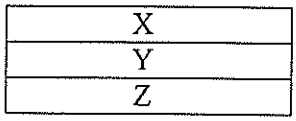
A. Audit trails
B. Data encryptions
C. Password security
D. Physical security

Continued...

30. A _____ of the database happens when only the objects that have been updated or modified since the last full backup are backed up.

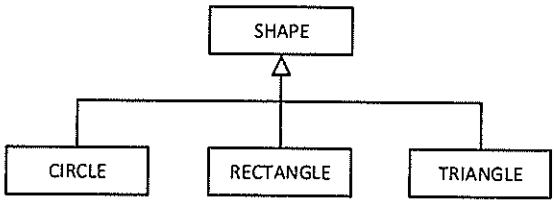
A. full backup
B. daily backup
C. differential backup
D. log file backup

31. The diagram shown below is a simple structure of a class diagram. What does section Z represent?



A. The attributes.
B. The class name.
C. The objects.
D. Possible operations that are associated with the class.

32. Based on the following UML diagram, what does the arrow represent?

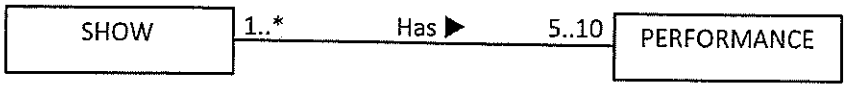


A. Association
B. Generalisation
C. Sub class
D. Super class

33. In a UML class diagram, when an attribute is written with the '-' (minus) symbol, it means that the attribute is _____.

A. Protected
B. Public
C. Private
D. Default

34. What does the following diagram state?



A. A show will have one or many performances.
B. A show will have between 5 and 10 performances.
C. One performance can be for 5 to 10 shows.
D. One performance can be only for one show.

Continued...

35. All of the following is TRUE about UML Diagram EXCEPT:

A. Primary keys are written with a [PK] symbol.
B. An association is a linkage between two classes.
C. Classes depict the abstract representation of real world objects.
D. It is used for object oriented analysis and design.

36. When data is said to be inaccurate and inconsistent, that means that it is _____.

A. dirty data
B. wrong data
C. null data
D. invalid data

37. In an organization, at the Middle Management level, the database role is to:

A. Enable strategic decision making and planning.
B. Represent and support company operations.
C. Monitor the use of resources.
D. Enhance the company's short-term operations.

38. A _____ data dictionary is not updated automatically and usually requires running a batch process.

A. dynamic
B. common
C. active
D. passive

39. Jackson is responsible in controlling the centralized and shared database in his company. What is Jackson's position?

A. Programmer
B. Database Administrator
C. Data Administrator
D. Systems Analyst

40. The introduction of a DBMS has been described as a process that includes which of these important aspects?

i. Technological
ii. Human Resource
iii. Managerial
iv. Cultural

A. i, ii and iii
B. i, ii and iv
C. i, iii and iv
D. i, ii, iii and iv

Continued...

SECTION B (60 Marks)

Instruction: Answer ALL questions from this section in the Answer Booklet provided.

Question 1 (20 Marks)

A boarding school in your area has asked you to design a simple system so that they could easily identify the students who are staying in the hostel rooms as well as the wardens who are in charge of each student blocks.

Each staff may be in charge of guarding a hostel block. This is not permanent because after certain duration the staff will change blocks. The guarding duty is rotational and not all the staff are required to do this duty. So it is important to keep track of the staff number, staff name and staff contact number as well as the start date and end dates of their guarding duties. The block name and location must also be recorded.

Each hostel block will have many rooms. The room details will be room number and room level. A student can occupy a room but might change rooms in different school terms. A room can be occupied by many students but in different terms. Not all rooms in a hostel block is used for student occupancy. Some rooms are used as store rooms and pantry.

There are many clubs in the school. The clubs are important so that students can enroll in extra co-curricular activities. The school has made it a rule that each student must enroll in at least one club. A club will have many students enrolled as members. The club details will be club name, club established date and the club fee. When a student registers in a club, the date of enrollment must be recorded.

Each student in the school will be assigned under one academic staff. A staff may be in charge of looking after many students. Not all staff are assigned students. The administrative staff will not be assigned any students. Once a student is assigned under the care of a staff, it will be permanent until the day they end their studies in the school. It is very important to know which staff is assigned to which student. Student's details such as student number, name, name of their guardian as well as the guardian's contact number must be recorded in case they need to be contacted.

Based on the situation given above, draw a complete Entity Relationship Diagram using the **Crow's Foot** notation which includes:

(i) All entities and attributes
(ii) Relationships
(iii) Connectivity and relationship participation
(iv) Primary and foreign keys

Continued...

Question 2 (20 Marks)

Write the SQL commands based on the tables given below.

MODEL Table

Model ID	Model	Screen	RAM	Battery	Price	Condition	Brand ID
1	Galaxy S8	5.80	4	3000	3288.00	New	1
2	Mi 6	5.15	6	3350	1988.00	New	4
3	iPhone 5	4.00	1	1440	679.00	Used	3
4	P9	5.20	3	3000	1609.00	New	5
5	Galaxy A7 (2017)	5.70	3	3600	1699.00	New	1
6	iPhone 7	4.70	2	1960	3199.00	New	3
7	C9 Pro	6.00	6	4000	2299.00	New	1
8	Galaxy Note 4	5.70	3	3000	1600.00	Used	1
9	Honor 6x	5.50	4	3340	1199.00	New	5
10	iPhone 6	4.70	1	1850	1089.00	Used	3

BRAND Table

Brand ID	Brand Name
1	Samsung
2	Asus
3	Apple
4	Xiaomi
5	Huawei

a) Write the SQL commands to display "New Price" if the Model Price was increased by 6% to include GST cost. [3 marks]

ModelName	ModelPrice	New Price
Galaxy S8	3288.00	3485.28
Mi 6	1988.00	2107.28
iPhone 5	679.00	719.74
P9	1609.00	1705.54
Galaxy A7 (2017)	1699.00	1800.94
iPhone 7	3199.00	3390.94
C9 Pro	2299.00	2436.94
Galaxy Note 4	1600.00	1696.00
Honor 6x	1199.00	1270.94
iPhone 6	1089.00	1154.34

b) Insert a new record as shown below. [3 marks]

Model	Screen	RAM	Battery	Price	Condition	BrandID
Asus Zenfone Go ZB552KL	5.50	2	3000	899.00	Used	2

c) Display the quantity of models available for each brand as shown below. [3 marks]

BrandName	Total
Apple	3
Asus	1
Huawei	2
Samsung	4
Xiaomi	1

d) Add another field in the Brand table called "BrandDate". This field will store the date the company was founded and it cannot be empty. [2 marks]

Continued...

e) Display the details of the brands established from the year 1980 to 2009. [2 marks]

BrandID	BrandName	BrandDate
2	Asus	1989-04-02
5	Huawei	1987-01-28

f) Display the brand names which has the highest RAM. [3 marks]

BrandName
Xiaomi
Samsung

g) Display the model that is new and has a screen size of more than 5 inches and price less than RM1500.00. [2 marks]

ModelID	ModelName	ModelScreen	ModelRAM	ModelBattery	ModelPrice	ModelCondition	ModelBrandID
9	Honor 6x	5.50	4	3340	1199.00	New	5

h) Change the battery capacity to 2700 and condition to "Used" for model "P9". [2 marks]

Continued...

Question 3 (20 Marks)

Given below is a sample record from MITC Convention Centre where many events are held. Based on the sample record.

a) Write the 1st, 2nd and 3rd Normal Forms. [16.25 marks]
b) Draw the Dependency Diagram for the 2nd Normal Form. [3.75 marks]

Event No.	EV34		EV322			EV401			EV276				EV423	
Title	When Classical Meets Pop		Bengal Tiger At The Baghdad Zoo			Comedy Central Asia: Stand-Up, Asia!			The Girl on The Train				Nikki's Day	
Date	23/8/2017		3/9/2017			6/2/2017			13/6/2017				12/5/2017	
Type ID	T1		T2			T3			T2				T3	
Type	Concert		Drama			Comedy			Drama				Comedy	
Ticket Price	350.00		125.00			205.00			315.00				110.00	
Organiser ID	Or232		Or502			Or232			Or491				Or502	
Organiser	Midas Promotions		Perfect Events			Midas Promotions			Creative Arts				Perfect Events	
Contact Person	Ali Hassan		Judy Tan			Ali Hassan			Jackson Danials				Judy Tan	
Email	ali.hassan@gmail.com		judy.tan@hotmail.com			ali.hassan@gmail.com			jack.danial@gmail.com				judy.tan@hotmail.com	
Member No.	MB302	MB1023	MB912	MB88	MB445	MB912	MB1023		MB302	MB734	MB302		MB445	MB395
Name	Usha Vellappan	James Lim	Maria Ahmad	Kamal Mansor	George Kumar	Maria Ahmad	James Lim		Usha Vellappan	Larry Chua	Usha Vellappan		George Kumar	Sarinah Selamat
Payment ID	P1	P2	P3	P2	P1	P2	P3		P3	P2	P2		P2	P1
Payment Type	Online Transfer	Credit Card	PayPal	Credit Card	Online Transfer	Credit Card	PayPal		PayPal	Credit Card	Credit Card		Credit Card	Online Transfer
Rating	3.5	2.7	-	3.0	4.1	2.8	2.7		3.9	4.2	-		4.5	3.9
Comments	Not bad!	Waste of time	-	As expected	It was nice	Not so good!	Waste of time		Fantastic	Nice	-		Wow...it was good	Very Funny :)

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